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FAB 38

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FOOD SCIENCE AND TECHNOLOGY ABSTRACTS

under the direction of:-

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## INTRODUCTION

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H. J. BROOKES  
EDITOR



## 1

**The physico-chemical changes in 'Coffee Complete' during storage.**

Bhanumurthi, J. L.; Mann, R. S.; Srinivasan, M. R.

*Indian Journal of Dairy Science* 33 (1) 34-37 (1980)

[4 ref. En] [Nat. Dairy Res. Inst., Karnal 132 001, India]

At 5-8°C, viscosity of 'Coffee Complete' [7.2% instant coffee, 8.2% milk fat, 20% milk SNF, 39.2% sugar] increased during the 1st 150 days of storage by 60% of its initial value; no further increase was noted until the end of the storage period of 540 days. Viscosity was objectionable after 30 days at 37 ± 1°C. The reconstitutability and flavour of the reconstituted product registered no perceptible change during the 1st 30 days of storage at 5-8°C. Subsequently, the product lost score for reconstitutability and flavour at the rate of 10 points for every 84 and 72-75 days of storage resp. until the product reached the min. chosen score of 50 points for the product to be acceptable. At storage temp. of 37 ± 1°C, the product lost score rapidly both for reconstitutability and flavour, the rate being 10 points loss for every 7 days. The pH of the product did not change appreciably during storage. It was concluded that 'Coffee Complete' had an acceptable fluidity, reconstitutability and flavour of reconstituted coffee until the end of 540 and 30 days at 5-8° and 37 ± 1°C. resp. AS

## 2

**Household apparatus for the roasting of coffee in small quantities.**

Chailoux, P. (Touillet, M.)

*United States Patent* 4 196 342 (1980) [En]

The apparatus comprises a container, either cylindrical or in the shape of a truncated cone, capable of receiving small quantities of unroasted coffee and which can be closed by a lid, and carried by a casing forming a base. A heating plate for roasting coffee forms the bottom of the container and is embedded in an electrical resister. A stirrer is mounted near the bottom of the container and is driven by an electric motor. A timer can be adapted to determine, particularly with respect to the quantity of coffee used and degree of roasting required, the heating time of the plate and time during which the stirrer is driven. SP

## 3

**Dispensing and mixing means for water and dehydrated coffee.**

Martin, E. N.; Keirns, M. L. (Societe d'Assistance Technique pour Produits Nestle SA)

*United States Patent* 4 194 651 (1980) [En]

A beverage dispensing machine has a hopper holding particulate dehydrated beverage concentrate with a dispenser for delivering a predetermined vol. of the concentrate into the mixing funnel, and a water supply delivering a predetermined vol. into the mixing funnel, where the beverage is reconstituted. An outlet tube on the funnel exhausts the moisture laden air and delivers the beverage. The hopper is enclosed in a compression chamber with an air pump to cool the hopper and the concentrate. SP

## 4

**Brewing apparatus for coffee and the like.**

Marotta, G. (North American Systems Inc.)

*United States Patent* 4 191 100 (1980) [En]

An infusion apparatus, particularly for brewing coffee or the like is described which includes a receptacle such as a coffee basket mounted on a water heating apparatus and a carafe positioned underneath the infusion chamber. The infusion chamber is made with relatively movable walls so that the cross-sectional area transverse to the direction of flow of liquid may be varied to vary the depth of infusion bed for a given quantity of coffee or the like in the chamber. SP

## 5

**Coffee-pot and coffee-mill combination.**

Takagi, S.; Miwa, Y. (Tokyo Shibaura Denki Co. Ltd.)

*United States Patent* 4 196 658 (1980) [En]

In a coffee-pot and coffee-mill combination, a cup accommodating section is provided adjacent to an electric motor for driving a grinder adapted to grind coffee-beans, and a case accommodating section and a water storing tank are provided above the motor and the cup accommodating section, resp. The grinder and a filter are provided in the case. The water in the water storing tank is heated by a heating section, and the hot water is supplied into the case to extract a coffee liquid. AS

## 6

**Coffee machine.**

Anderl, S. (Württembergische Metallwarenfabrik)

*United States Patent* 4 200 039 (1980) [En]

A coffee machine is described comprising a pressure-tight boiler having a hot water tank and a cold water tank of about half the vol. of the hot water tank, a heater located in the hot water tank, a filter chamber, a discharge line connected to the filter chamber and an ascending tube running from the bottom of the hot water tank to the inlet end of the discharge line. SP

## 7

**[Studies on aroma of coffee. I. Head space gas chromatographic method using internal standard for determination of aroma of roast and ground coffee.]**

Osajima, Y.; Shimoda, M.; Iriki, E.; Ito, H.; Sakane, Y.

*Journal of Japanese Society of Food Science and Technology* [Nippon Shokuhin Kogyo Gakkaishi] 26 (3) 105-110 (1979) [Ja, en] [Lab. of Food Analysis, Fac. of Agric., Kyushu Univ., Fukuoka, Japan]

An internal standard method for the gas chromatographic headspace analysis of the aroma of roast and ground coffee was developed. The method involved sealing a glass vessel, containing ground coffee, with a silicon rubber septum from which was hung a filter paper strip. The internal standard solution (3% sec-butanol, in benzyl alcohol) was injected onto the paper strip with a microsyringe. After equilibration at 30°C for 1 h, the headspace gas was analysed by gas chromatography. Results showed that the relative amount of aroma, based on a relative peak height (sec-butanol = 1.00) was little influenced by temp. A linear relationship was found between quantity of internal

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standard used and its peak height. Reproducibility based on coeff. of variation ranged from 3.2% (propionaldehyde) to 10.0% (n-hexane) for quantitative analysis of aroma constituents in the headspace gas. Aroma characteristics and changes in flavour during storage of ground coffee were studied by comparison of the relative concn. of 10 constituents in the headspace gas of the above control. [From En summ.] SP

## 8

## [Purification of coffee-roasting smoke.]

Anon.

*Genie Industrial Engineering Actualites* No. 93, 37-39 (1979) [Fr]

The Ufima coffee-roasting and conditioning establishments situated in an urban area have 2 drum roasters of resp. 600 and 800 kg/h capacity installed in 1966 and provided with additional smoke-combination compartment constructed by Probat. Smoke contents of organic compounds with and without smoke-combustion were on average resp. 50-60 and 150-200 mg N/m<sup>3</sup>, with max. values at end of a cycle of 400 and 1500 mg N/m<sup>3</sup>, purification being about 70% at 450°C. temp. of smoke treatment. In 1974 and 1975, 2 Probat RZ 1500 roasters, and in 1979 1 Probat RZ 2500 roaster of resp. 1200 and 2000 kg/h capacity, were installed. The roasters are described and photographically and diagrammatically illustrated. They incorporate smoke purifiers giving about 85% purification, rising to 95% with inclusion of a catalyser at the chimney entry; hot gas recycling reduces energy consumption to about 45 kWh/100 kg coffee. SKK

## 9

## Coffee maker, electric, automatic.

United States of America, General Services Administration, Federal Supply Service

*Federal Specification* W-C-500A, 18pp. (1978) [En]

[Washington, DC 20406, USA]

This specification supersedes W-C-500:1968, and covers coffee makers comprising bowl units (metal or glass) with 12 cup (60 oz) min. brewing capacity. AL

## 10

## Steam and hot liquid dispensing device.

Knecht, H. (Adams Industries Inc.)

*United States Patent* 4 204 465 (1980) [En]

A steam and hot liquid dispensing device e.g. for espresso coffee has a pressure sealable container in which liquid under pressure is heated to produce steam and/or super-heated liquid. A dispensing mechanism includes a valve device which selectively delivers steam or super-heated liquid through separate outlets from the heated container. AS

## 11

## [Equipment for grinding food products.]

Vorob'ev, G. Z.; Zhinkov, V. F.; Sidorets, N. I. (Yuzhnyi Mashinostroitel'nyi Zavod)

*USSR Patent* 745 495 (1980) [Ru]

Equipment for grinding food products, especially coffee, contains a housing with lid, drive with knives and interlocking gears, so arranged that the lid cannot be opened while the drive is in action. W&Co

[First Cekaline packaging system on stream.] Erstes Cekaline-Verpackungssystem in voller Produktion. Anon.

*Verpackungs-Rundschau* 30 (12) 1622 (1979) [De]

The Cekaline packaging system, devised by the Swedish firm Esseltepac, is used to vacuum-pack ground coffee. The packaging consists of an outer rectangular carton (duplex) with an inner bag made of a heat sealable laminate (polyester/Al foil/polyethylene). The lid consists of a kraft paper base lined with low-quality cardboard. Product shelf-life is > 1 yr. The packaging machine is a modification of the Ceka/Hermeted system: devices to form the outer carton, the inner bag and the lid, and the vacuum filling apparatus have been added. Packaging rate is 60 packages/min. Compression devices decrease coffee vol. by 5-10%, thereby reducing amount of packaging material needed. Cartons for 200 g-1 kg coffee can be manufactured. The vacuum inside the packaging is ≤ 99.5%. IN

## 13

## Coffee substitute.

J. Ashby & Sons Ltd.

*British Patent* 1 565 736 (1980) [En]

A coffee substitute is described which may be brewed in the conventional manner and comprises a mixture of roasted barley 46-49%, chicory 23-24%, fig 14-16.5% and soybeans 11.5-12.5%. Coffee flavouring may also be added. IFT

## 14

The determination of fluorine in coffee and tea using a microprocessor coupled with a fluoride ion-selective electrode.

Moody, G. J.; Ong, B.; Quinlan, K.; Riah, A. H.; Thomas, J. D. R.

*Journal of Food Technology* 15 (3) 335-343 (1980)

[22 ref. En] [Chem. Dep., Univ. of Wales Inst. of Sci. & Tech., King Edward VII Avenue, Cardiff CF1 3NU, UK]

An Orion 94-07 F<sup>-</sup>-sensitive electrode was used in conjunction with an Orion Ionanalyser/901 meter for detn. of F<sup>-</sup> in tea leaves and instant coffees, either from F<sup>-</sup> concn. in brewed beverages, or in solutions prepared after dry ashing in a Schöniger oxygen flask. All detn. were performed in the CONCN mode (requiring calibration against a standard F<sup>-</sup> solution) or in the KA/10 mode (requiring standard addition to each sample). The CONCN mode was particularly useful and allowed 40 samples/h to be processed. After Schöniger flask combustion teas contained 1096-1499 p.p.m. F<sup>-</sup>, instant coffees 272-317. Brewed teas indicated contents of 138-245 p.p.m. DM; values for made coffee were 30.5-39.9 p.p.m. DM. Further studies are being made of the non-infusion F<sup>-</sup> fraction in teas and coffees. Results of detn. of F<sup>-</sup> are tabulated in full for 5 brands of tea and 3 brands of instant coffee. DIH

## 15

[Radioactivity of crude coffee beans imported into Romania.]

Szabo, E.

*Igiena* 29 (1) 45-49 (1980) [21 ref. Ro, en] [Lab. de Igiena Radiatiilor, Cent. Sanitar & Antiepidemic Judetean, Targu-Mures, Romania]

Studies were conducted on the radioactivity of 18 samples of coffee beans and 2 samples of coffee extract, imported from various countries over the period 1975-1978. Data are given for concn. of DM and K, and total  $\beta + \gamma$ -activity,  $^{40}\text{K}$  activity and residual activity of the samples. Ranges of values for these characteristics were for the beans: DM 83.72-95.20%; K 0.57-2.94 mg/g;  $\beta + \gamma$ -activity 4.63-10.51 pCi/g;  $^{40}\text{K}$  activity 0.47-2.32 pCi/g; and residual activity 2.90-9.38 pCi/g. Corresponding values for the extracts were 92.00-96.62%; 1.04-2.05 mg/g; 15.86-16.35 pCi/g; 0.87-1.71 pCi/g; and 14.64-14.90 pCi/g. It is calculated that an average cup of coffee would expose the consumer to a radiation dose of 26.64 pCi. AJDW

16

**[Polycyclic aromatic hydrocarbons in roasted coffee beans.]**

Nistor, C.

*Igiena* 29 (1) 51-54 (1980) [18 ref. Ro, en, ru] [Inst. de

Igiena &amp; Sanatate Publica, Iasi, Romania]

25 samples of roasted coffee beans, from 3 commercial sources in Romania, were analysed for polycyclic aromatic hydrocarbons (PAH) by UV spectrophotometry. Mean concn. of individual PAH were ( $\mu\text{g}/\text{kg}$ ): pyrene 0.81; phenanthrene 0.51; chrysene 0.01; coronene 2.01; and 3,4-benzpyrene 0.02. The possible health hazard from PAH in foods is discussed, together with possible measures for reduction of PAH formation during roasting, etc. AJDW

17

**Process for the removal of undesirable constituents from raw coffee beans.**

Kurzhals, H. A.; Sylla, K. F. (Decofa Kaffee-Bearbeitungs-GmbH)

*United States Patent* 4 215 150 (1980) [En]

An extraction process employs mixtures of esters and ketones for the removal of constituents from raw coffee beans which contribute to the presence of undesired stimulants in roasted coffee without changing the original caffeine content. IFT

18

**New tryptamine derivatives isolated from wax of green coffee beans.**

Folstar, P.; Schols, H. A.; Plas, H. C. van der; Pilnik, W.; Landheer, C. A.; Veldhuizen, A. van

*Journal of Agricultural and Food Chemistry* 28 (4) 872-874 (1980) [8 ref. En] [Lab. of Food Chem., Agric. Univ., De Dreijen 12, 6703 BC Wageningen, Netherlands]

Some unknown 5-hydroxytryptamine derivatives were found to be present in the cuticular wax of green coffee beans. They were isolated by polyamide column chromatography and HPLC on a reversed-phase column and were identified by MS, IR spectrometry, proton magnetic resonance, and UV spectrometry as  $N_{\beta}$ -(20-hydroxyarachidoyl)-5-hydroxytryptamine and  $N_{\beta}$ -(22-hydroxybehenoyl)-5-hydroxytryptamine. AS

**Automatic filter-type coffee maker.**

Bollman, H.; Heimrath, E. (Braun AG)

*United States Patent* 4 208 957 (1980) [En]

A coffee maker is described which has a reservoir for water connected to a conduit terminating above a holder for coffee grounds on a coffee carafe. A heater in this conduit heats the water and moves it along the conduit into the coffee-ground holder. The heater is energized briefly and then turned off so that a limited quantity of water can brew with and pass through the ground coffee. The heater is again energized to heat and displace the rest of the water into the holder. AS

20

**Infuser primarily intended for use in making coffee.**

Moskowitz, P. M.; Rushansky, Y. (Salton Inc.)

*United States Patent* 4 206 694 (1980) [En]

An infuser which is primarily intended for use in making coffee can be constructed utilizing a container having a bottom inlet. A filter element is located within the interior of the container so that the position of the filter element relative to the bottom of the container can be adjusted. RAW

21

**Process for the decaffeination of raw coffee beans.**

Kurzhals, H.; Sylla, K. F. (Decofa Kaffee-Bearbeitungs-GmbH)

*United States Patent* 4 207 352 (1980) [En]

Raw coffee beans (moisturized to 15-55% water content) are decaffeinated by treatment with a low mol. wt. ester of an organic acid and a ketone having a boiling point <100°C. IFT

22

**Dual reservoir coffee urn.**

Brill, F. D. (Restaurant Technology Inc.)

*United States Patent* 4 207 809 (1980) [En]

A coffee brewing and serving machine comprises an upper housing portion from which hot water flows downwards through a removable large funnel containing a large perforated basket with filter paper and coffee grounds, into a coffee tank divided into 2 equal coffee urns. RAW

23

**Electric coffee maker.**

Leuschner, U.; John, F. (Bosch-Siemens Hausgeräte GmbH)

*United States Patent* 4 205 598 (1980) [En]

An electric coffee maker is described having a coffee pot in the form of a Dewar flask supported in a shock-proof outer casing. Water from the fresh water container above the coffee pot passes through an electric flow-through heater and the hot water passes through a hot water conduit to the top of the filter, situated above the coffee pot. SP

24

**Processing and utilization of plantation products of India. [Review]**

Lewis, Y. S.; Seshadri, R.; Nagalakshmi, S.; Kuppuswamy, S.; Udaya Shankar, K.; Krishnamurthy, N.; Shivashankar, S.; Nambudiri, E. S.

**Journal of Food Science and Technology, India** 17 (1/2) 38-42 (1980) [74 ref. En] [Cent. Food Tech. Res. Inst., Mysore-570 013, India]

Aspects considered in this review are processing and utilization of tea, including processing machinery, instant tea production, and utilization of tea and its by-products; coffee, covering storage, quality control, roasting and brewing, product development and packaging, adulteration and waste utilization; and processing of cocoa, spices, and areca nuts. CFTRI

25

**[Method for decaffeinating raw coffee.] Verfahren zur Entcoffeinierung von Rohkaffee.**

Coenen, H.; Kriegel, E. (F. Krupp GmbH)

**German Federal Republic Patent Application**

2 846 976 (1980) [De]

Raw coffee containing 35-40% water is extracted with a solvent above its critical temp., particularly propane at 43-300 bar (preferably 100-150 bar) and 97-150°C (preferably 97-120°C). The propane is separated and evaporated from the caffeine, and the partially dry coffee is dried off. W&Co

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**[Use of enzymes for increasing the output of coffee substitute extract.] Enzymeinsatz zur Steigerung der Produktion von Kaffee-Ersatz-Extrakt.**

Müller, G.; Floss, A.; Mrozek, E.

**Lebensmittelindustrie** 27 (5) 220-226 (1980) [7 ref. De, en, ru, fr] [Bereich Mikrobiol., Humboldt-Univ., Berlin]

In manufacture of coffee substitute extract (based on roasted rye + barley, with the addition of caramel colour), aqueous extracts containing > 20-25% DM cannot be spray-dried, because of excessive viscosity. Treatment of the extract with  $\alpha$ -amylase,  $\beta$ -glucanase and neutral protease preparations reduces viscosity to an acceptable level ( $\leq 40$  mPa s) even at DM concn. of 46%. This process modification permits a considerable increase in the throughput of the spray-drier unit. IN

27

**[Coffee processing: chemical, physical and technological aspects. III. Effects of roasting on the chemical composition of some coffee blends.]**

Lerici, C. R.; Lercker, G.; Minguzzi, A.; Matassa, P.

**Industrie delle Bevande** 10 (3) 232-238 (1980) [8 ref. It]

After reviewing methods of coffee roasting, viz. direct flame, pre-heated air and fluidization, the usual automatic processes in the USA (at 260-280°C for 5-7 min; total wt. loss approx. 5%) are compared with manually controlled processes in Italy (at 220-240°C for from 12-15 to > 20 min; total wt. loss approx. 15%). 5 blends of 2 coffees, *Coffea arabica* and *C. canephora* (var. *robusta*) in proportions of (i) 100/0; (ii) 60/40; (iii) 50/50; (iv) 30/70; (v) 0/100, were roasted, and samples taken before and after roasting were analysed for contents of moisture, total sugars, proteins, fats, fibre, ash and non-N extracts (as % DM). Results showed a

diminution in sugars and an increase in lipids after roasting; the concn. remained greatest in (i) (16.87 and 0.63% for sugars in unroasted and roasted samples, resp., with corresponding concn. of 13.99 and 18.09% for lipids), and least in (v) (9.56 and 0.52%, and 10.10 and 12.39%, resp.). A graph showing changes in the concn. of the major constituents, determined at 0, 4, 9, 12 and 15 min, showed 3 phases: the 1st of considerable dehydration with wt. loss of approx. 7%; the 2nd (after 4-12 min) giving a sharp fall in sugar content and a slight fall in ash content; and the 3rd giving wt. loss of > 9%. The more *C. robusta* in the blend the longer was the time required for completion of processing (min. of 14 min for (i), max. of 18 min for (v)). [See FSTA (1979) 11 11H1918 for part II.] KME

28

**[Effects of the application of insecticides to control *Hypothenemus hampey* (Ferr. 1867) on the polyphenoloxidase activity and beverage quality of coffee.]**

Oliveira, J. C. de; Teixeira, A. A.; Silva, D. M.; Amorim, H. V.

**Cientifica** 7 (2) 221-224 (1979) [15 ref. Pt, en] [Dep. de Fitotecnia da Fac. de Ciencias Agrarias e Vet. de Jaboticabal, UNESP, Brazil]

Coffee beans were sprayed with normal concn. of BHC, Dieldrex and Sumithion insecticides when the degree of infestation of the plant was about 5%. The beans were subsequently harvested at the ripe stage, and pulped with alkaline solution on the same day. The insecticides had a negligible effect on the polyphenoloxidase activity, but a taste panel rated beverage from BHC-treated beans considerably lower than beverage from untreated controls (Dieldrex and Sumithion had no noteworthy effect). It is therefore considered that the polyphenoloxidase test may require modification. HBr

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**[Process and apparatus for roasting an agricultural food product.]**

Rios, G.; Gilbert, H.; Crouzet, J.; Vincent, J.-C. (France, Agence Nationale de Valorisation de la Recherche (ANVAR)

**French Patent Application** 2 434 580 (1980) [Fr]

This process is used for roasting granulated products, e.g. coffee or cocoa, which swell and lose wt. when heated. An auxiliary substance in the form of fine, solid particles is fluidized in a housing, and the grains of the product to be roasted are floated in the fluidized bed of particles, the temp. of which is adjusted such that roasting is effected by the fine particles of the auxiliary substance striking the grains of the product. W&Co

30

**Continuous desorption apparatus for aroma flavor concentrate.**

Strobel, R. G. K. (Procter & Gamble Co.)

**United States Patent** 4 204 464 (1980) [En]

An invention is described which includes a process and apparatus for the production of an aroma flavour concentrate from aroma and flavour-bearing substrates, specifically roasted and ground coffee. The invention involves a process for continuously de-aromatizing and

desorbing aroma and flavour constituents from the substrates by passing wet steam counter-currently through a continuous columnar bed of the substrate flowing upwards through an upright vacuum-tight desorption column. RAW

### 31

#### Fruit and tropical products.

Commonwealth Secretariat

**Fruit and Tropical Products** Dec., 89pp. (1979) [En] [Marlborough House, London SW1Y 5HX, UK]

This publication covers the world import, trade, distribution, prices and production of fruit (including citrus, apples, pears, bananas, and pineapples, as juices, canned, bottled, frozen or fresh products), vegetable juices, coffee, cocoa, vegetable oils and oilseeds (such as olive, palm, soybean, rapeseed and tung oils) and spices (including pepper, capsicum, pimento, cloves, ginger, cardamom, vanilla, cinnamon, cassia, turmeric, coriander and fenugreek). LH

### 32

#### Process for roasting an agro-food product in a fluidized bed of inert particles.

Rios, G. M.; Gilbert, H.; Crouzet, J.; Vincent, J.-C. (France, Agence Nationale de Valorisation de la Recherche)

**United States Patent** 4 215 151 (1980) [En]

Beans, e.g. cocoa, coffee etc., are roasted in a fluidized bed of inert particles; during the drying and roasting the beans become lighter and rise to the top of the bed for overflow removal. IFT

### 33

#### Chicory, vegetables and cereal - is there any coffee in there?

Lee, S.

**Tea and Coffee Trade Journal** 152 (5) 8, 48 (1980) [En]

Analysis of coffee for "fillers" (chicory, vegetables, cereals) is reviewed as applied to coffee beans, ground and roast, and instant coffee. RM

### 34

#### Coffee in Venezuela. The making of a soluble plant.

Rolsgaard, J.; Petersen, E. E.

**Tea and Coffee Trade Journal** 152 (7) 26-27, 50 (1980) [En]

The new INCATACA plant for freeze-dried soluble coffee production set up in Rubio, Tachira State, Venezuela, is described with details of equipment and operation (capacity 900 t freeze-dried coffee/yr). RM

### 35

#### An evaluation of instant and regular coffee in the Ames mutagenicity test.

Aeschbacher, H. U.; Würzner, H. P.

**Toxicology Letters** 5 (2) 139-145 (1980) [14 ref. En] [Nestle Products Tech. Assistance Co. Ltd., Biol. Exp., Services Orbe, CH-1350 Orbe, Switzerland]

2 coffees were examined, namely a 'home brew' coffee prepared on a Melitta-filter exactly as for human consumption (50 g/l water) and then freeze-dried and a commercially available instant coffee powder (Nescafe standard). Samples of both coffees were diluted in hot tap water and then sterilized by autoclaving at 120°C. The sterilized solutions were then examined by the Ames mutagenicity test using *Salmonella* strains TA 1535, 1537, 1538, 98 and 100 either with or without metabolic activation. The direct plating (Ames) test was applied and also 2 other mutagenicity assays: (i) host-mediated assay using *Salmonella* TA1530 as indicator organism; (ii) intrasanguine test using *Escherichia coli* K-12 (343/113) as indicator organism. Results are tabulated and their implications discussed. Both coffees increased the number of revertants by 2-2.7-fold of the spontaneous level only in the case of the most sensitive strain (TA 100); this effect was observed at 35 mg coffee/plate, the highest concn. which was not bactericidal for the revertants. When both coffees (concn.  $\leq$  50 mg/plate) were tested in the presence of a microsomal metabolic activation system, the induction of mutagens and the bactericidal effect on complete agar plates were completely abolished. The authors suggest that even if a real mutagenic induction is caused by coffee, this effect is abolished by the action of liver microsomal enzymes; this deactivation was confirmed by the negative results obtained with assays (i) and (ii). JA

### 36

#### Caffeine content of common beverages.

Bunker, M. L.; McWilliams, M.

**Journal of the American Dietetic Association** 74 (1) 28-32 (1979) [20 ref. En] [St. Luke Hospital, Pasadena, California, USA]

This study updates and supplements existing information on the caffeine content of beverages. The comparison is based on quantities in average servings the beverage as consumed. Caffeine levels were determined in the following: 5 brands of instant and freeze-dried coffee; 4 brands of ground coffee brewed by automatic and non-automatic percolators, non-automatic dripolator and automatic coffee maker; 3 brands of black, 2 brands of green and 1 brand of Oolong bag teas brewed for 1, 3 and 5 min; 6 brands of loose leaf teas brewed for 1, 3 and 5 min; 6 brands of carbonated cola beverage; 2 other brands of soft drinks; 2 brands of canned iced tea; and 2 brands of instant cocoa. Results are tabulated. A significant difference was found in caffeine levels due to brewing time of tea and preparation method of coffee. Coffee prepared by the dripolator method had twice the caffeine of instant coffee. The mean values for tea were considerably lower than for coffee. VJG

### 37

#### Apparatus for making a coffee beverage.

Zimmermann, J.

**United States Patent** 4 211 156 (1980) [En]

The apparatus, enclosing a filter bag filled with a portion of coffee powder, has at least 1 moving wall and a handle for producing a pump-like action driving a current of water transversely through the filter bag. AS

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**Coffee maker.**

Sakai, K.; Ikeyama, K. (US Philips Corp.)

**United States Patent** 4 211 157 (1980) [En]

A coffee maker is described which includes a housing with a hinged cover at its top. An arcuate flange adjacent to the hinge side of the cover extends downwards from the inner surface of the cover in the closed position of the cover; a flange extends radially inwards and obliquely downwards from the lower edge of the arcuate flange to form a receptacle. When the cover is moved into its opened position, condensation water on the inner surface of the cover flows into the receptacle. When the cover is returned to its closed position, the condensation water flows into the housing. AS

39

**Head space gas chromatography with glass capillaries using an automatic electropneumatic dosing system.**

Kolb, B.; Pospisil, P.; Borath, T.; Auer, M.

*Journal of High Resolution Chromatography and Chromatography Communications* 2 (6) 283-287 (1979) [11 ref. En] [Bodenseewerk Perkin-Elmer & Co. GmbH, D-7770 Überlingen, Federal Republic of Germany]

Headspace GLC using a special electropneumatic sampling system works well in combination with glass capillaries. Because a homogeneous gas mixture is already present, most problems inherent with inlet splitters are avoided. In cases where high vapour pressure of the sample can cause problems with the pressure-controlled sampling system, narrow bore glass capillaries provide the necessary inlet pressure. Applications, including headspace analysis of coffee aroma, are shown. RM

40

**[More rational coffee packaging. Aroma-protection valve for flexible pressure pack.] Kaffee-Abpacken noch rationeller. Aroma-Schutzventil für flexible Druckabgabepackung.**

Anon.

*Verpackungs-Rundschau* 31 (4) 475-476, 478 (1980) [De]

Packaging of roasted pure coffee is difficult as the coffee releases large quantities of CO<sub>2</sub> long after roasting. Generally either flexible packages which are not completely sealed (to enable excess pressure equalization) are used, or if sealed packages are to be used the coffee undergoes removal of O<sub>2</sub> and water vapour and is packed after an intermediate storage period. Grinding the coffee accelerates the degassing process. In a new Hesser packaging process a laminated film pack is perforated, the perforation being covered with a valve label (Aroma protective valve V 10). The packages are filled under a low-O<sub>2</sub> atm and sealed. Residual O<sub>2</sub> concn. is approx. 10 µg/g product. The degassing process decreases residual O<sub>2</sub> concn. to 10%

of the initial value. Excess pressure in the outside atm results in the valve closing immediately. A high output machine producing 110 × 250-g packages/min is already in use; machines with medium output can also be equipped with devices necessary for this type of packaging. IN

41

**Coffee maker.**

Castleberry, B. J. (AAA Office Coffee Service Inc.) **United States Patent** 4 222 320 (1980) [En]

A coffee brewing apparatus has a hot water reservoir on a housing above a grounds basket. The carafe rests upon a warming plate below the basket. The control unit is attached to the reservoir and is held by 2 screws to the housing so that the control unit and the reservoir may be removed as a unit from the housing for maintenance. The pouring tray is clamped to the top of the reservoir to form a vapour seal between the hot water reservoir and pouring tray. This seal prevents the machines "boiling dry" by preventing vapours from escaping to condense on the apparatus. AS

42

[Method for decaffeinating raw coffee.] Verfahren zum Entcoffeinieren von Rohkaffee.

Werkhoff, P.; Hubert, P. (Hag AG)

**German Federal Republic Patent Application** 2 853 169 (1980) [De]

Raw coffee is decaffeinated by treating the raw coffee, which has previously been treated with steam or water, with organic solvents and removing the solvent residue with steam. The solvent used is acetone.

W&amp;Co

43

**On applications of electronic grain moisture meter.** (In 'Food process engineering 1979' [see FSTA (1981) 13 4E167]) [Lecture]

Lövegren, C.

Abstr. no. 3.1.28 (1979) [En] [Ot-tehdas Oy, Helsinki, Finland]

Uses of the electronic grain moisture meter (Wile-35) are described, i.e.: for measuring the moisture content of ripening grain to determine the optimum moment for harvesting, and for taking moisture readings during artificial drying to achieve the right level for safe storage without overdrying. Scales and conversion tables are available for wheat, barley, rice, corn and coffee. The Ot-tehdas firm has also introduced a continuously operating moisture meter for grain dryers to replace hygrometers. ELC

44

**Specification for instant (soluble) coffee.**

Kenya, Kenya Bureau of Standards

**Kenya Standard** KS 01-175:1978, 12pp. (1978) [En]

This standard prescribes requirements for soluble coffee powder derived by dehydration of aqueous

extract of freshly roasted and ground coffee, and also covers hygienic conditions and packaging. Specific requirements include: moisture content, < 3.5% by mass; total ash (on dry basis), < 15% by mass; caffeine content (on dry basis), > 2.8%. Sampling and testing methods for detn. of these parameters, for detn. of solubility in hot and cold water, and the cup test for solubility are given. KME

45

**Green coffee - Size analysis - Manual sieving.**  
International Organization for Standardization  
**International Standard ISO 4150-1980**, 4pp. (1980)  
[En]

A test portion of whole green coffee is separated into fractions according to size by manual sieving using a nest of test sieves with round or slotted holes, and the results are expressed as % by mass. AL

46

**[Determination of caffeine in foods by GLC.]**

Klatsmanyi, J.; Zala, P.  
*Elelmezesi Ipar* 34 (9) 336-338 (1980) [12 ref. Hu, en, de, ru] [Megyei Elelmiszerellenörzö & Vegyvizsgalo Intezet, Kinizsi-u 79, Zalaegerszeg, Hungary]

A procedure for detn. of caffeine in coffee and in cola soft drinks is described. Caffeine is extracted with chloroform, the solvent is evaporated off, the residue is re-dissolved in acetone, and this solution is analysed by GLC on a Chromosorb WAW/10% SE 30 column with an N-specific detector. Accuracy and reproducibility were acceptable. Data are tabulated for caffeine concn. determined in various types of coffee and cola drinks by this method; max. caffeine concn. recorded were 1.53 g/100 g for coffee, and 125.5 mg/l for cola drinks. AJDW

47

**[Machine for decorticating or shelling grain products contained in husks.]**

Westerby, P.  
**French Patent Application** 2 437 870 (1980) [Fr]  
A rotary type decorticator is described which is suitable for shelling and decorticating cocoa and coffee beans, etc. RAW

48

**[The wild coffee trees of Kenya: survey and cultivation.]**  
Berthaud, J.; Guillaumet, J.-L.; Pierres, D. le; Lourd, M.  
**Cafe-Cacao-The** 24 (2) 101-112 (1980) [15 ref. Fr, de, en, es] [ORSTROM, BP 434, Mau, Ivory Coast]

A survey of wild coffee trees in Kenya revealed the presence of 4 species: *Coffee arabica*, *C. eugenioiodes*, *C. zanguebariae* and an indeterminate species. Their descriptions include tabulated results of caffeine detn., which ranged from 0.34 to 0.64% on DM in the fruits. RM

50

**[Reconstruction of coffee bean roasting in a biscuit and wafer factory.]**

Raduly, Z.; Zsapka, J.

**Edesipar** 31 (2) 48-49 (1980) [Hu, de, ru]

The installation of a 'Gothot' coffee bean-cleaning and roasting line with 2 'Rapido Nova 2000' roasting machines (3000 kg/h roasted coffee beans) in combination with the mechanization of the transport of the raw material has eliminated pollution, provided constant quality and improved working conditions. It also reduced the costs of labour and energy. ESK

51

**Robusta coffee.**

Lewis, N. A. (Procter & Gamble Co.)

**United States Patent** 4 226 891 (1980) [En]

Process for preparing an improved, mainly non-decaffeinated Robusta coffee comprises extraction with a single phase non-chlorinated organic solvent system containing < 10% water and containing a major proportion of acetone and a minor proportion of low mol. wt. alcohol with 1-3 carbon atoms. IFT

52

**Instant coffee.**

Procter & Gamble Co.

**British Patent** 1 573 755 (1980) [En]

Process for the production of instant coffee from roasted ground coffee particles employs combined steam and water extraction. IFT

53

**Microbiological decaffeination of aqueous liquids.**

Haas, G. J.; Stieglitz, B. (General Foods Corp.)

**United States Patent** 4 228 191 (1980) [En]

Aqueous caffeine-containing liquids e.g. coffee extracts, are decaffeinated by either fermenting the liquid with the pseudomonad microorganisms *Pseudomonas putida* NRRL B-8051, *P. fluorescens* NRRL B-8052 and *P. fluorescens* NRRL B-8053 or by contacting the liquid with a caffeine metabolizing enzyme preparation isolated from the above pseudomonad organisms. RAW

54

**Coffee roaster.**

Advance Co. Ltd.

**UK Patent Application** 2 039 451A (1980) [En]

Coffee roasting apparatus employs a temp. sensitive element which extends into and directly contacts the beans during roasting. IFT

55

[Changes in roasted Arabica coffee stored in four model packagings. Changes in the volatile fraction. Comparison with a control. Optimum utilization time limit.]

Cros, E.; Fourny, G.; Guyot, B.; Rouly, M.; Vincent, J.-C. *Cafe-Cacao-The* 24 (3) 203-226 (1980) [13 ref. Fr, en, es, de] [IFCC, Avenue du Val de Monferrand, BP 5035, 34032 Montpellier Cedex, France]

Sensory analysis, head space analysis (44 compounds), and changes in beverage acidity were used to study the storage of green Colombian Arabica coffee beans for 40 wk in 4 model packagings - loose (7 kg, in bulk), simulated normal packaging (mylothene metallic, 230 g/packet), vacuum packaging, bags with a valve, and a control (deep-frozen 7 h after roasting). Results are shown graphically and in tables. Sensory analysis showed that the definition of optimum storage time depends on the control (in the present case 6-26 wk); storage in airtight packaging promotes retention of the aromatic character of the beverage; increase in acidity and reduction in the aromatic character of the beverage depends on the air tightness of the packaging. Chemical analysis showed that composition of the volatile fraction depends on storage time, and all samples follow a decreasing curve of the type  $y = ae^{-bt} + C$ ; the optimum utilization limit date has no significance since all samples change after roasting; the 4 samples were substantially identical during 2 months of storage; the acidity and the buffering power of the beverage give information on the packaging. AS

56

ABC of coffee: coffee terms.

Anon.

*Indian Coffee* 44 (7) 153; (8/9) 180; (10) 213 (1980) [En]

This series continues with definitions of several coffee terms (beginning with letters K, L and M). [See also FSTA (1980) 12 8H1310.] CFTRI

57

Infusion package.

Fornari, H. C.

*United States Patent* 4 229 481 (1980) [En]

An improved sachet package is used for preparing infusion of particulate aromatic substances, e.g. coffee or tea. IFT

58

Kenco computerised coffee plant.

Anon.

*Food Trade Review* 50 (12) 659-660 (1980) [En]

A description is given of the £1 million computerized coffee processing plant of the Kenco Coffee Company, of Earlsfield, London, UK. The electronic process control system gives centralized control from coffee input, through cleaning, blending and roasting. VJG

59

The Philippines recommends for coffee 1977.

[Booklet]

Philippines, Philippine Council of Agriculture & Resources Research  
62pp. (1977) [30 ref. En]

This publication includes a section on processing coffee (dry process, modified dry process, wet process, pre-drying, drying, hulling, grading, bagging/storage) and a section on by-products utilization. RM

60

Moisture content/equilibrium relative humidity relationship of parchment coffee.

Kulaba, G. W.; Henderson, S.

*Kenya Coffee* 45 (534) 271-276 (1980) [14 ref. En]  
[Kenya Ind. Res. & Development Inst., PO Box 30650, Nairobi, Kenya]

The moisture contents and equilibrium RH (ERH) of parchment coffee (Arabica) were studied at 25°C using 2 dewpoint methods for the detn. of ERH. The results of measurements over 6-50% moisture contents are presented and discussed in relation to published data, the phenomenon of hysteresis, and 6 physically distinct stages observed during drying of parchment coffee. No significant hysteresis was detected between the curves for moisture adsorption and desorption. The moisture sorption isotherm appeared smooth over the whole range of moisture levels studied. AS

61

Infusion device.

Cuccia, B.

*United States Patent* 4 230 033 (1980) [En]

Device is described for automatically producing a coffee infusion by means of a single control for a continuously rotating motor. Device comprises various means to proportion, place and infuse a charge of coffee, a means to compress the infused charge so as to form a press cake, and means to eject the press cake. AS

62

Apparatus for making hot beverages.

Sandor, S. D.

*United States Patent* 4 226 175 (1980) [En]

Even if freshly roasted and freshly ground coffee is used when percolating hot coffee, much or at least part of the fragrances and aromas originally contained in the coffee beans disappear instead of staying with the brew. To save these aromas and fragrances, method and an apparatus are described where roasting and grinding of the coffee beans take place inside the flask where the beverage gathers, thus assuring that all or most of the aromas and fragrances generated during roasting and grinding stay contained in the flask until the coffee is served. AS

## 63

[Drying of coffee using the 'Vitoria' drier: modifications to the prototype, and evaluation of the processed coffee.]

Jordao, B. A.; Okada, M.; Pulz, F. S.; Mori, E. E. M.  
*Boletim do Instituto de Tecnologia de Alimentos, Brazil* 17 (2) 189-204 (1980) [7 ref. Pt, en] [Inst. de Tecnologia de Alimentos, Campinas, Sao Paulo, Brazil]

A series of modifications to a 'Vitoria' batch-type coffee bean drier (capacity 2500 kg beans) is described: data are given for drying performance, fuel consumption, the fuel consumption/water evaporation ratio, drying time, and initial and final moisture contents and apparent densities of the coffee beans for various modifications to the drier design, together with data for drying time and initial and final moisture contents and apparent densities for naturally-dried samples. Studies were also conducted on the organoleptic properties of naturally and artificially-dried samples. The results show that artificial drying in the modified drier gives a product with organoleptic properties equal to those of naturally-dried samples. Drying time is reduced by a factor of approx. 13; considerable reductions in labour requirements are possible. AJDW

## 64

ABC of coffee: coffee terms.

Anon.

*Indian Coffee* 44 (4) 57; (5) 85; (6) 113; (11) 234 (1980) [En]

This series continues with definitions of various terms used in the coffee industry. [See also FSTA (1981) 13 6H924.] CFTRI

## 65

Flavour extracts.

Procter & Gamble Co.

*UK Patent Application* 2 040 666A (1980) [En]

Flavour extracts are obtained from coffee, tea, cocoa beans, and fruits by continuous desorption of an aqueous extract through a columnar bed of substrate using countercurrent flow. IFT

## 6,6

[Determination of caffeine content of coffee and caffeine-containing foods using the Extrelut column.] Über die Bestimmung von Coffein in Kaffee und coffeinhaltigen Lebensmitteln mit Hilfe der Extrelut-Fertigsäule.

Lehmann, G.; Haug, I.; Schlösser, R.

*Zeitschrift für Lebensmittel-Untersuchung und -Forschung* 172 (2) 87-89 (1981) [3 ref. De, en] [Univ. des Saarlandes, D-6600 Saarbrücken, Federal Republic of Germany]

Use of commercial pre-packed Extrelut (Merck) kieselguhr columns for detn. of caffeine is described. Caffeine is extracted from ground coffee or instant coffee, 20 ml extract is pipetted onto the column, and caffeine is eluted with methylene chloride. Absorbance of the eluate is measured at 272 nm. Procedures for detn. of caffeine in decaffeinated coffee and tea are also

given; interfering substances are removed from the extract by adsorption onto polyamide powder. Caffeine is determined in soft drinks after removal of interfering aroma compounds by distillation, and precipitation of sugar with  $\text{Ca}(\text{OH})_2 + \text{CuSO}_4$ . Trigonellin may also be determined in coffee by eluting the aqueous phase from the Extrelut column with 5% NaCl solution and measuring absorbance at 264 nm. The method was used to determine caffeine contents in a number of the previously mentioned beverages. Mean contents found, and ranges (in % dry wt, with number of samples in parentheses) were: roast and ground coffee (11) 1.48, 1.17-2.45; 'semi-decaffeinated' roast coffee (10) 0.92, 0.80-1.01; decaffeinated roast coffee (8) 0.070, 0.047-0.090; tea (10) 2.55, 1.78-3.15; and caffeine-containing soft drinks (mg/l) (7) 131, 86-168. DIH

## 67

Apparatus for the dearomatization of coffee oil.

Hurlow, G. S.; Blain, J. R.; Coombes, M.; Richard, J.-C.; Hutchinson, P. W. (General Foods Ltd.)

*United States Patent* 4 232 598 (1980) [En]

This invention relates to an improved process for the separation and isolation of coffee aroma constituents from roasted coffee, combining the aroma constituents with an edible substance, e.g. coffee oil, and subsequently incorporating the aromatized substance in a food product, e.g. instant coffee. The process involves improving the condensation of vapours generated from the distillation of coffee oil by condensing the distilled aroma constituents onto a sleeve cooled by and snugly surrounding a container filled with coolant. The sleeve is removed and the aroma constituents condensed thereon are then preferably combined with an edible substance by manipulating the condensed constituents quickly and efficiently, thus minimizing aroma loss and degradation caused by undesirable prolonged contact with air. RAW

## 68

[Electron spin resonance spectra of green and roast coffee.] Elektronenspinresonanz-Experimente an Roh- und Röstkaffeeproben.

Diaz Santanilla, J.; Fritsch, G.; Müller-Warmuth, W. *Zeitschrift für Lebensmittel-Untersuchung und -Forschung* 172 (2) 81-86 (1981) [14 ref. De, en] [Dep. de Fisica, Univ. Nacional Bogota, Bogota, Colombia]

The electron spin resonance (ESR) spectra of coffee display, in addition to signals arising from paramagnetic ions ( $\text{Fe}^{3+}$ ,  $\text{Mn}^{2+}$ ) intensive lines near  $g = 2$ . These are assigned to free radicals, the number of unpaired spins/gram amounting to bout  $10^{14}$ - $10^{15}$  for unroasted coffee-beans,  $10^{16}$  for roasted coffee,  $10^{14}$  for coffee-extract, and  $10^{17}$  for grounds. By measuring the concn. of free radicals in different samples and by observing

the change during storage, information has been obtained which concerns the influence of the various technological processes. The concn. of free radicals and its dependence upon time reacts sensitively to the water content. Increase after roasting can be explained by a first order reaction of formation. AS

69

**Robusta coffee.**

Lewis, N. A. (Procter &amp; Gamble Co.)

**United States Patent 4 234 613 (1980) [En]**

Process is described for preparing a mainly non-decaffeinated Robusta coffee with improved aroma and flavour by contacting the roasted coffee with a low mol. wt. alcohol for approx. 1-20 min, thus making an improved roast and ground coffee and coffee blend.

AS

70

**Coffee. [Book]**

Kolpas, N.

157pp. ISBN 0-7195-3674-X (1979) [En] London, UK;

John Murray (Publishers) Ltd. Price £4.50

This book gives history, a buying guide, advice on choosing a good brew and a guide to serving coffee. Many drawings, engravings and photographs are given. Chapters are: Coffee's epic history (pp. 14-56); From plantation to market (pp. 58-82); Coffee in your home (pp. 84-104); Coffee around the world (pp. 106-134); and A coffee miscellany (pp. 136-155). LH

71

**[Spectrophotometric determination of the caffeine content of green and roasted coffee beans.]**

Domolki, F.; Halmi, G.

**Edesipar 31 (4) 113-114 (1980) [5 ref. Hu, de, ru]**

Spectrophotometric detn. (Spektronom 204) of the caffeine content in 9 types (Columbia, Santos, Minas, Ecuador, Peru, Burundi, Nicaragua, Victoria, and Robusta from Uganda) of green coffee beans and 3 types (Omnia, Mocha, and Caravan) of roasted coffee beans showed that this well reproducible (absolute divergence in green and roasted coffee beans was  $d = 0.15$  ( $d^2 = 0.04$ ) and  $d = 0.4$  ( $d^2 = 0.18$ ), resp.), simple and rapid method could replace the presently used gravimetric method. ESK

72

**Instant milk-containing coffee.**

Ishigaki, T. (Ishigaki Shokuhin Inc.)

**UK Patent Application 2 044 069A (1980) [En]**

Coffee, sugar and dried cream are packaged successively without intermediate separations from each other in an elongated moisture-proof bag from which air is removed. By suitably choosing the relative particle sizes of the 3 ingredients their intermixing is prevented. The packaging of all the ingredients needed in a single pack simplifies the preparation of coffee compared with the situation when each ingredient is in a separate pack. [See also FSTA (1979) 11 4H556.] FL

73

**Storage and pest control strategy for preservation of foodgrains in India. [Review]**

Majumder, S. K.

**Journal of Food Science and Technology, India 17 (1/2) 55-58 (1980) [20 ref. En] [Cent. Food Tech. Res. Inst., Mysore-570 013, India]**

Research accomplishments of the past 3 decades in India are reviewed. The aspects dealt with are: pre-harvest prophylaxis for stored food grains; insect proofing of gunny bags and coffee in storage by the ballooning technique; non-toxic grain protectants such as activated earth, tricalcium phosphate and bacterial insecticide (spores of *Bacillus thuringiensis*); infestation control in rural storages; and development of manpower in disinfestation research and application. CFTRI

74

**Half a million creams a day.**

Anon.

**Food Manufacture 55 (7) 57 (1980) [En]**

A fully automatic packaging plant recently commissioned at Menken Dairy Foods BV, Netherlands, produces 65 000 portion-size cups of coffee cream/h. The thermoforming machine which feeds the packaging lines incorporates a  $H_2O_2$  sprayer to sterilize the web and lidding material prior to formation of the cups; the material never comes into contact with a non-sterile atmosphere until the final seal has been made. JRR

75

**Fruit and tropical products.**

Commonwealth Secretariat

**Fruit and Tropical Products Dec., 88pp. (1980) [En]**  
[Marlborough House, London SW1Y 5HX]

Trading figures and statistics for various food commodities are tabulated. Data on fruit covers: fruit production; UK imports of several fresh, canned and dried fruits and juices; EEC fresh fruit trade; USA fresh, canned, and frozen fruit trade and juice markets; southern hemisphere apple and pear shipments. Data on coffee covers: production; sources of exports and imports; distribution; stocks; prices at various stages. Data on cocoa covers: production; sources of exports and imports; cocoa butter trade; grindings of raw cocoa; cocoa prices. Data on oilseeds and vegetable oils includes: production of major oilseeds and oil therefrom; exports and distribution of selected oilseeds and oils; imports; stocks; prices. Data on spices includes: trade, distribution, sources and prices of pepper; trade in other spices in several countries e.g. Singapore, various EEC countries, USA, Australia and several Asian countries. LH

76

**Efforts made to ensure freshness.**

Robbins, T.

**Tea and Coffee Trade Journal 152 (11) 22-23, 46 (1980) [En]**

Packaging installations to ensure freshness of tea and coffee by Rose Forgrave machines are described, including the fully automated loose tea packaging plant at Cadbury Typhoo's factory (Moreton, Merseyside) and the combined packaging and gas-flushing ( $N_2$ ) plant at Kenco Coffee Co. RM

77

**Production and storage of 'Coffee Complete'.**

Bhanumurthi, J. L.; Satyanarayana, P.; Trehan, K. S.; Srinivasan, M. R.; Samlik, O.

*Indian Journal of Dairy Science* 32 (3) 217-221 (1979)  
[2 ref. En] [Nat. Dairy Res. Inst., Karnal 132 001, India]

'Coffee Complete' was prepared by incorporating commercial instant coffee into sweetened condensed milk base. Highest organoleptic score (25.6 out of a max. 30) was obtained for the product made with 8% instant coffee, reconstituted by 7-fold dilution with boiling water. Mean composition of this product was 7.2% instant coffee, 8.2% milk fat, 20% milk SNF, 39.2% sucrose and 25.4% moisture; it had a bacterial content of <2000/g. Viscosity increased gradually during storage for 540 days at 5-8°C, 240 days at room temp. or 60 days at 37°C, the increase being most marked at the highest temp.; pH changed little during storage at any of the 3 temp. Predicted shelf life of the product was 530, 154 and 31 days at 5-8°C, room temp. and 37°C resp. CDP

78

**Specification for roasted coffee-chicory powder.**

Bangladesh, Bangladesh Standard Institution

*Bangladesh Standard* BDSS 806-1973, 8pp. (1975) [En]  
[3 Dit (Extension) Avenue, Matijheel Commercial Area, Dacca-2, Bangladesh]

Requirements, packaging, marking, sampling and tests are specified for roasted coffee-chicory powder, containing  $\geq 60\%$  by wt. of coffee. AL

79

**Aflatoxin contamination in grains from the Pacific coast in Guatemala and the effect of storage upon contamination.**

Campos, M. de; Crespo Santos, J.; Olszyna-Marzys, A. E

*Bulletin of Environmental Contamination and Toxicology* 24 (5) 789-795 (1980) [14 ref. En] [Inst. of Nutr. of Central America & Panama (INCAP), Guatemala]

145 grain samples (corn, coffee, black beans, sorghum, rice, and sesame seeds) were collected from silos, homes and small shops in different villages on the southern coast of Guatemala. 45 samples were fumigated with CS<sub>2</sub> and stored for 6 months during the dry season. 50 duplicate samples of corn, beans and rice were collected within 20 days of harvest in the middle of the rainy season and after 2 months storage. Results are tabulated. 31% of samples stored for 6 months during the dry season were contaminated with aflatoxins, 16% exceeding the 20 parts/billion (p.p.b.) level. Max. value of 37 p.p.b. was found in a coffee sample. In the first set of 50 duplicate samples (collected 20 days after harvest), 16% were found to be positive, 6% exceeded the 20 p.p.b. level with a max. value of 130 p.p.b. Duplicate samples analysed 2 months later showed a high increase in aflatoxin contamination: 24% were contaminated, 16% had values  $> 20$  p.p.b. and 12% had values  $> 100$  p.p.b. Max. value 1650 p.p.b. was found in corn.

None of the 3 rice samples was contaminated. Grains from hot and humid southern coast of Guatemala were very susceptible to aflatoxin contamination, especially during the rainy season. VJG

80

**Synergistic effect of chlorogenic acid and thiocyanate on in vitro formation of N-methyl-N-nitrosoaniline under physiological conditions.**

Lathia, D.; Frentzen, U.

*Food and Cosmetics Toxicology* 18 (5) 463-465 (1980)  
[14 ref. En] [Fachhochschule Niederrhein, Fachbereich Ernährung/Hauswirtschaft, Richard-Wagner-Str. 101, 4050 Mönchengladbach, Federal Republic of Germany]

Rate of formation of N-methyl-N-nitrosoaniline (NMNA) from nitrite and N-methylaniline in the presence of (i) chlorogenic acid (a phenolic component of coffee) and/or (ii) thiocyanate at levels likely to be encountered in vivo was studied in a series of in vitro reactions. (i) had a marked catalytic effect, directly related to its concn., (ii) also catalysed NMNA formation. (i) and (ii) had a cumulative effect on the reaction. Increase in NMNA yield was indirectly proportional to (i) concn. at constant level of (ii). These

results indicate that (i) and (ii) may have some synergistic effect on in vivo nitrosamine formation if ingested simultaneously, and may thus significantly increase human exposure to carcinogenic nitrosamines VJG

81

**[NMR investigation of the internal movement and binding of water in green and roasted coffee beans.]**

NMR-Untersuchungen über innere Bewegungen und über den Einbau von Wasser in Roh- und Röstkaffee. Santanilla, J. D.; Fritsch, G.; Müller-Warmuth, W.

*Zeitschrift für Lebensmittel-Untersuchung und -Forschung* 172 (3) 173-177 (1981) [7 ref De, en] [Dep. de Fisica, Univ. Nacional Bogotá, Colombia]

Samples of unroasted coffee beans, roasted coffee, and grounds were studied by NMR spectroscopy. <sup>1</sup>H-NMR wideline-, high resolution-, and pulsed spectroscopy at various temp. and moistures yielded

information on internal motions and on the incorporation of water. The spectra can be explained by a superposition of at least 3 different contributions. The water, which exists or which is added to the coffee, occurs in 3 states which are more or less closely bound. The macromolecular material which is generally rigid contains in addition amorphous islands of very high mobility. AS

82

**ABC of coffee: coffee terms.**

Anon.

*Indian Coffee* 44 (12) 265; 45 (1) 3; 45 (2) 31 (1980; 1981) (1980; 1981) [En]

The series continues with definitions of several coffee terms [see also FSTA (1981) 13 6H1059]. AL

83

**Optical properties of instant tea and coffee solutions.**  
 Little, A. C.; Brinner, L.  
*Journal of Food Science* 46 (2) 519-522, 525 (1981)  
 [16 ref. En] [Dep. of Nutr. Sci., Univ. of California,  
 Berkeley, California 94720, USA]

The optical properties of soluble tea and coffee were studied using thin-layer transreflectometry with samples backed by white and black reflecting surfaces. The red, green, and blue transreflectance readings, calculated internal transmittances, and scattering and absorption coefficients provided information relating to effect of electrolytes on brew colour, to changes in light transmittance and scatter on incremental addition of nondairy creamer to samples dissolved in distilled water and in mineralized water, and to the separate effects of pH and dissolved electrolytes on colorimetric and visual characteristics of the brews. Application of Kubelka-Munk analysis provided physical explanations for visually perceived attributes and reinforced the proposition that with judicious application, even from 'abridged' data, such an analysis can be a valid and powerful tool. IFT

84

**Methods of test for coffee and coffee products.**  
**V. Green coffee: size analysis by manual sieving.**  
 United Kingdom, British Standards Institution  
*British Standard* BS 5752:Part 5, 4pp. ISBN 0-580-11841-X (1981) [En] [2 Park Street, London W1A 2BS, UK]

This standard is identical with ISO 4150-1980 [see FSTA (1981) 13 4U190].

85

**Gas-liquid chromatographic detection and determination of diacetyl tartaric acid ester of diglyceride in dairy and nondairy coffee cream powders.**

Inoue, T.; Iwaida, M.; Ito, Y.; Tonogai, Y.  
*Journal of the Association of Official Analytical Chemists* 64 (2) 276-279 (1981) [2 ref. En] [Nat. Inst. of Hygienic Sci., Osaka Branch, 1-1-43, Hoenzaka, Higashi-ku, Osaka, 540, Japan]

Diacetyl tartaric acid ester of diglyceride was directly extracted from dairy or nondairy coffee cream powder under acidic conditions with ethyl acetate; then the extract was saponified with methanolic potash. After acidification with HCl, free fatty acid was removed with ether and the reaction mixture was adsorbed on an anion exchange column. Tartaric acid was eluted with 2N NaOH/acetone (1 + 1). An aliquot of the trimethylsilyl (TMS) derivative of the eluate was injected into a gas chromatograph with flame ionization detection, and a 1.5% SE-30 column. Recoveries of diacetyl tartaric acid ester of diglyceride at 50, 200 and 2000 p.p.m. were 85.6-99.5%. AS

86

**Apparatus for processing particulate solids.**  
 Smith, H. L., Jr. (Smitherm Industries Inc.)  
*United States Patent* 4 246 836 (1981) [En]

Reactors are described in which solids can be processed by fluid-solids contact. The reactors include a shell housing, and an assembly or rotor which rotates a bed of solids and displaces the solids from a 1st location where they are introduced into the reactor, to a 2nd location, where they are discharged. The solids are contacted with the process fluid as they are displaced. The apparatus can be used e.g. in coffee roasting. RAW

87

**'Breathing valve' key to this new coffee pack.**  
 Anon.

*Food Engineering International* 5 (7/8) 39-41; 21, 23, 25 (1980) [En, Fr, De, Es]

Packaging machinery made by Hesser, a division of Robert Bosch GmbH, packs ground coffee or beans into a conventional laminated film bag and then inserts a non-return valve into the package to allow venting of gas from the coffee during retail display. Throughput of the machine is 110 x 250 g packages/min. DIH

88

**Process for the decaffeination of coffee.**  
 Zosel, K. (Studiengesellschaft Kohle mbH)  
*United States Patent* 4 247 570 (1981) [En]

In the decaffeination of coffee by contacting the coffee with water-moist CO<sub>2</sub> above its critical temp. and critical pressure, during the contacting the coffee is maintained in admixture with an adsorbent, e.g. active charcoal, activated aluminium oxide etc., which takes up the caffeine from the CO<sub>2</sub>. RAW

89

**[Coffee processing: chemical, physical and technological aspects. Transformation processes. IV. Evolution of certain physical characteristics of coffee during roasting.]**

Lericci, C. R.; Dalla Rosa, M.; Magnanini, E.; Fini, P.  
*Industrie delle Bevande* 10 (5) 375-381 (1980) [9 ref. It]  
 [Istituto di Ind. Agrarie, Univ. di Bologna, Bologna, Italy]

Tests using 3 samples of *Coffea arabica* (Ethiopian, Central American, Venezuelan) and 1 of *C. canephora* var. *robusta* (Ugandan) simulated industrial conditions on a small scale; coffee beans were roasted in a rotating drum to ascertain by expert visual assessment the best degree of roasting to obtain a satisfactory colour, and hence optimum aroma and taste, with the least wt. and apparent density losses and vol. gain. Values (at 0-12 min) are graphically recorded; mathematical interpretation of results showed that for all 4 samples there was a good degree of correlation with the *f* factor (the function of the change in colour of ground coffee after roasting for a given number of min), and the colour of the surface of the bean at the optimum degree

of roasting. Therefore, *f* could be used as a suitable parameter for evaluating the characteristics of roasted coffee. It was concluded that 11 min is the optimum roasting time. [See FSTA (1981) 13 2H421 for part III.] KME

## 90

[Determination of caffeine, theobromine and theophylline in tea, coffee, cocoa and beverages by HPLC with electrochemical detection.] Bestimmung von Coffein, Theobromin und Theophyllin in Tee, Kaffee, Kakao und Getränken durch Hochdruckflüssigkeitschromatographie mit elektrochemischem Detektor.

Sontag, G.; Kral, K.

*Mikrochimica Acta* II (1/2) 39-52 (1980) [17 ref. De, en] [Inst. für Anal. Chem. der Univ. Wien, Währinger Strasse 38, A-1090 Vienna, Austria]

A method was developed for the quantitative detn. of caffeine, theobromine and theophylline in several beverages. Investigation of the voltammetric behaviour of these substances at a glassy carbon electrode showed that simultaneous voltammetric detn. was impossible because the  $1/2$ -peak potentials of caffeine and theobromine are nearly identical. Therefore the methylxanthines were separated by HPLC and detected with an amperometric detector. The method was applied to tea, coffee, cocoa and beverages (Cola). After extraction with water, interfering substances were removed on a polyamide column and the extract separated by reversed phase chromatography. Identification and quantitative detn. was done by electrochemical detection. Limits of detection were: caffeine 4 ng, theobromine 1.5 ng, theophylline 0.7 ng. Coeff. of variation (6 replicates) were: for caffeine in coffee 2.2% (8.9% in decaffeinated coffee); for theophylline 7.7% (beverage unspecified, presumed tea); for theobromine 2.1% in cocoa and 6.5% in tea. AS

## 91

Flavor-odor taste interactions in solutions of acetic acid and coffee.

Garcia-Medina, M. R.

*Chemical Senses* 6 (1) 13-22 (1981) [14 ref. En] [Lab. de Investigaciones Sensoriales, Buenos Aires, Argentina]

2 experiments explored the relation between flavour magnitude and odour and taste magnitudes of acetic acid and coffee. In the case of acetic acid, all 3 attributes (odour, taste, flavour) varied with concn. in approx. the same way. Flavour fell slightly, but uniformly, below the sum of odour magnitude and taste magnitude. In the case of coffee, flavour and taste magnitude grew relatively rapidly and odour relatively slowly with concn. Nevertheless, flavour again fell uniformly below the sum of odour magnitude and taste magnitude. A vector summation model previously applied with success to odour mixtures provided a very adequate description of the relation between flavour and constituents. The applicability of the model in the present instance implies that neither taste nor smell contributes to flavour at the expense of the other. AS

## 92

Small batch roasting reborn.

Enberg, K. R.

*Tea and Coffee Trade Journal* 153 (1) 46-47 (1981) [En]

The design and operation of the Burns Thermalo coffee roasting plant is described with the aid of a diagram. In this plant, the air is heated and then circulated through a perforated rotating cylinder containing the beans; thus in the convective approach, the roasting medium is heated moving air. By recirculating the air from the rotating cylinder to the heating chamber, energy consumption is kept low. 2 small self-contained plants are marketed, for 60 kg or 30 kg, resp. At 60 kg green coffee/batch, 1920-2400 kg green coffee can be roasted/8 h day. The plants can be fuelled by manufactured, natural or liquid petroleum gas or No. 1 and 2 fuel oils (kerosene or diesel). RM

## 93

Coffee extraction.

Societe des Produits Nestle SA

*British Patent* 1 571 156 (1980) [En]

Process is described for the continuous extraction of roasted coffee or tea by passage of an extraction liquid over a bed of coffee or tea under defined conditions to give, in the case of coffee, an extract having a flavour of domestic or espresso coffee as opposed to instant coffee. IFT

## 94

A comparison of sun-drying of coffee under different water proof covering materials.

Kamau, I. N.

*Kenya Coffee* 45 (536) 325-328 (1980) [3 ref. En] [Coffee Res. Sta., PO Box 4, Ruiru, Kenya]

6 makes of waterproof covering materials were tested and recommended for use in drying Arabica coffee in Kenya. Coflex, Nylex and Evey Tents PVC can be used without detectable adverse effects on coffee quality. AS

## 95

[Formation of aroma compounds in roasted coffee.]

Artem'ev, B. V.

*Izvestiya Vysshikh Uchebnykh Zavedenii,*

*Pishchevaya Tekhnologiya* No. 2, 55-57 (1980) [5 ref. Ru] [Moskovskii Kooperativnyi Inst. Moscow, USSR]

The balance method (described, with numerous mathematical formulae) was used to evaluate changes in contents of aroma compounds in roasted ground coffee; the method allows for variation in the contents due to loss of volatile substances and other processes. Using a gas extraction technique, it was seen that the concn. of aroma compounds in the ground coffee was 33 and 18.3  $\mu\text{g/g}$  before and after extraction, resp. The concn. in the coffee beverage contained 2140  $\mu\text{g/g}$  aroma substances, reduced to only 2132  $\mu\text{g/g}$  after distillation. The analytical method used showed that roasted ground coffee can produce considerable amounts of aroma substances when converted into a hot beverage. STI

96

**Decaffeination process.**

Margolis, G.; Chiovini, J. (Societe d'Assistance Technique pour Produits Nestle SA)

**United States Patent 4 251 559 (1981) [En]**

Caffeine is extracted from solutions, e.g. aqueous extracts of vegetable material such as tea or coffee, with super-critical  $\text{CO}_2$  of density  $\geq 0.85 \text{ g/ml}$ . RM

97

**Coffee decaffeination.**

Rushmore, D. F. (Societe d'Assistance Technique pour Produits Nestle SA)

**United States Patent 4 237 288 (1980) [En]**

Process for the removal of caffeine from a solution of caffeine in a fatty medium comprises contacting the solution with a hydrophilic, phenol/formaldehyde polymeric resin having phenolic functional groups, and then separating the resin. IFT

98

**Recent developments in the manufacture of instant coffee and coffee substitutes.**

Stolize, A.; Masters, K.

**Food Chemistry 4 (1) 31-39 (1979) [5 ref. En] [A/S Niro Atomizer, Copenhagen, Denmark]**

This paper describes modern production methods resulting from recent developments in instant coffee and coffee substitute manufacture, i.e. new processing techniques to achieve higher extraction yields and improve extract concn., and more efficient spray-drying. Flow sheets are shown for modern instant coffee powder production plants, a rotating disc agglomerator and a coffee substitute plant. The storage and cleaning of the raw material, roasting, extraction, extract treatment, spray-drying and packing are discussed in separate sections. A tabulated comparison of operating conditions for spray-drying pure chicory, pure coffee and a 40/60 chicory/coffee mixture is included. RM

99

**Improving the coffee shrub in West Africa.**

Coste, R.

**Food Chemistry 4 (1) 7-11 (1979) [2 ref. En] [IFCC, 34 Rue des Renaudes, 75017 Paris, France]**

Arabusta, a hybrid of the Arabica and Robusta coffee spp., with high fertility and disease resistance, also possesses improved beverage flavour and intermediate caffeine contents of about 2% (vs. 1.5 for Arabica, 2.5 for Robusta). RM

100

**Chlorogenic acids - their complex nature and routine determination in coffee beans. [Review]**

Clifford, M. N.

**Food Chemistry 4 (1) 63-71 (1979) [43 ref. En]**

[Grimsby Coll. of Tech., Nuns Corner, Humberside DN33 5BQ, UK]

The literature on characterization and detn. of the chlorogenic acids complex in coffee and coffee products is reviewed with attention to the nature of the complex and its confusing trivial nomenclature, the behaviour of

chlorogenic acids during roasting, and simple methods for accurate routine analysis. An automated method using the periodate reagent (0.25% aqueous sodium metaperiodate) is recommended. Some 98% of total chlorogenic acids are measured, interference is negligible, the procedure is simple, cheap, quick and of high repeatability and reproducibility. For fingerprinting or information on individual isomers, HPLC is recommended. RM

101

**The effect of dewaxing of green coffee on the coffee brew.**

Stegen, G. H. D. van der

**Food Chemistry 4 (1) 23-29 (1979) [23 ref. En] [DEJ Int. Res. Co. BV, Utrecht, Netherlands]**

The 2 commercially most important mild treatments for green coffee are steam treatment and dewaxing. In the first, green coffee is just steamed. In the second, the waxy layer is extracted with an organic solvent and solvent residues removed by steam treatment. Some of the main constituents of the waxy layer are the carboxy-5-hydroxytryptamides (C-5-HT). The fate of these components during coffee roasting and brewing is discussed: during roasting, part of the C-5-HT decompose; during brewing most of the C-5-HT remain in the spent grounds due to their insolubility. Literature reports on the physiological effects of coffee subjected to both types of treatment are briefly summarized. Additional evidence is required on their effect on coffee digestibility. AS

102

**Coffee mixtures - spectrophotometric method for the determination of coffee content.**

Kazi, T.

**Food Chemistry 4 (1) 73-80 (1979) [9 ref. En] [Lyons-Tetley Ltd., Greenford, Middlesex, UK]**

A method is described for estimating coffee contents in roasted coffee mixtures with roasted chicory or figs. The Kulka procedure [*Biochemical Journal* (1956) 63, 542] based on the Seliwanoff test (1887) was adapted for estimating coffee contents via detn. of ketose sugars (high in chicory and fig, virtually absent in roasted coffee). Recoveries of added coffee were 99.3-100.2% in coffee/chicory mixtures, 99.1-100.4% in coffee/fig mixtures. The method was also applied to coffee and chicory essence, cereal products and instant coffee/chicory and coffee/cereal/chicory mixtures. RM

103

**Diffusion phenomena during the decaffeination of coffee beans.**

Bichsel, B.

**Food Chemistry 4 (1) 53-62 (1979) [En] [Zyma SA, CH-1260 Nyon, Switzerland]**

With respect to caffeine diffusion the coffee bean behaves almost perfectly as a spherical model system. This behavior is a result of at least 2 opposite effects - taking up of solvent and water loss. The overall change of the diffusion coeff. caused by these factors is small compared with the shifts brought about by the parameters investigated, viz. water content and temp.

The effects of these variables may reasonably be expressed by a single quantity, i.e. the mean apparent diffusion coeff. For Columbia and Robusta coffee at optimal experimental conditions this is in the range of  $0.5-1.3 \times 10^{-6} \text{ cm}^2/\text{s}$ . AS

## 104

**International coffee standardization and legislation.**  
Clarke, R. J.

*Food Chemistry* 4 (1) 81-96 (1979) [17 ref. En] [General Foods Ltd., Banbury, Oxon, OX16 7QU, UK]

The author describes the particular technical features of coffee standards used commercially and/or legislatively. Existing national standards on green coffee and their harmonization of terminology, sampling and test method are described and discussed. The legislative standards of different countries are compared with respect to instant coffee and their harmonization within the EEC member countries. Roasted coffee is considered to a lesser extent as it is not an important element in world coffee trade. The role of various international organizations in standardization is described. It is emphasized that the flavour of coffee is not amenable to international standardization. AS

## 105

**Analytical study of the reaction of N-bromosuccinimide with purines. I. N-methylated xanthines, caffeine, theobromine and theophylline.**  
El-Zahabi, M. M.; El-Din Ibrahim, G.; Ahmad, A. K. S.  
*Egyptian Journal of Pharmaceutical Sciences* 18 (2) 199-204 (1977) [2 ref. En, ar] [Fac. of Pharmacy, Azhar Univ., Azhar, Egypt]

Kinetics of the reaction of *N*-bromosuccinimide (NBS) with the purine alkaloids caffeine, theobromine and theophylline (commonly present in beverages such as tea and coffee) were examined using indirect titrimetric techniques. The detn. can be used to measure alkaloids in beverages. Reaction products were investigated by TLC and physical identification, and were methyl urea, dimethyl alloxan and methyl alloxan from caffeine and theobromine. Further study of reaction products is needed. LH

## 106

**Mechanical drying of Arabica coffee in Kenya.**  
Kamau, I. N.

*Kenya Coffee* 45 (537) 343-355 (1980) [6 ref. En]  
[Coffee Res. Sta., PO Box 4, Ruiru, Kenya]

2 types of mechanical driers for raw coffee beans were studied, i.e. (i) the Law & Denis BSR133 semi-continuous column drier, and (ii) the Kongside vertical static silo drier. Tabulated data show the results of liquor tests from mechanically dried coffee soon after drying and after 1, 3 and 5 months' storage, as well as drying parameters and drying conditions for BSR133 and a Kongside monitoring programme chart. It was concluded that mechanical drying with the Law-drier was possible without adverse effect on coffee quality at coffee bean temp.  $\leq 38^\circ\text{C}$  (inlet air temp.  $40^\circ-50^\circ\text{C}$ ) though it should only supplement (and not substitute for) sun drying; mechanically dried coffee should be cured for  $\geq 2$  months; the drier could be used as a skin

drier as well as final stage drier without adverse effects on bean quality; the drying period could be reduced to 12.5% of the time needed for sun drying. When using the Kongside vertical drier for drying coffee in stages 2 (white stage, moisture content 44-33%), 4 (medium black stage, 21-16%) and 5 (hard black stage, 15-12%) with inlet air temp.  $\leq 35^\circ\text{C}$ , the quality of coffee was not affected. The fuel consumption was increased when the drier was used at times of low ambient temp. and high RH. RM

## 107

**Plant restructuring undertaken.**  
Downing, G.

*Tea and Coffee Trade Journal* 152 (11) 20-21, 36 (1980) [En]

The restructuring of Venezuela's coffee processing facilities is described. It involves concn. of processing in Central factories (Centrales), equipped with machinery from E. H. Bentall & Co. A standard system was designed which can be modified according to local conditions and process 250-2000 t green beans/season. RM

## 108

**Decaffeination of aqueous extracts.**  
Prasad, R.; Gottesman, M.; Scarella, R. A. (General Foods Corp.)

*United States Patent* 4 246 291 (1981) [En]

Aqueous extracts of roasted coffee are stripped of aroma, concentrated, and decaffeinated by contacting with a decaffeinating fluid such as liquid or supercritical  $\text{CO}_2$ . Aroma loss is minimized by using water to remove caffeine and aroma from the  $\text{CO}_2$  stream, recovering aromatics from this caffeine-containing aqueous stream and adding-back these aromatics to the decaffeinated extract. Equipment cost is minimized by use of a single pressure vessel to transfer the caffeine from the extract stream to the  $\text{CO}_2$  and from the  $\text{CO}_2$  to the water stream. AS

## 109

**The chemistry of coffee extraction in relation to polysaccharides.**

Thaler, H.

*Food Chemistry* 4 (1) 13-22 (1979) [12 ref. En] [Inst. of Food Chem., Tech. Univ., Fasanenstrasse 3, 3300 Braunschweig, Federal Republic of Germany]

Technically produced extracts from roasted Arabica and Robusta coffees, like domestic infusions, contain 20-36% carbohydrates, depending on the degree of extraction. They are composed chiefly of approx. equal amounts of mannan and galactan, with only 1-3% glucan and araban. Dialysis allowed the separation of a group of polysaccharides with mol. wt.  $> 10\,000$ ; they make up about half the carbohydrates in the extracts, with about the same composition. Another group of almost intact high polymeric carbohydrates was obtained as Cu complexes, consisting of about 0.1 to  $> 0.5\%$  glucan, with 94% mannan, 6% galactan in normally roasted Arabica coffee, 88% mannan, 10-12% galactan in Robusta. While Arabica released only a limited amount of these very high mol. wt. polymers, the amounts released by Robusta increased with extraction yields. RM

## 110

### Laminated insulated hot drink cup.

Watkins, J. B.; Black, G. N. (Hallmark Cards Inc.)

**United States Patent** 4 261 501 (1981) [En]

An insulated, decorative hot drink cup for hot coffee, etc. is described which can be grasped and drunk from without burning the user's fingers. The cup includes an inner, integral, synthetic resin cup with a series of spaced, exterior, longitudinally extending, triangular in cross section ribs on the sidewall and an outer decorative paper overwrap permanently applied over and in contact with the ribs. This structure has a series of discrete, juxtaposed, dead air chambers or cells in the cup assembly sidewall for max. heat insulation, and the thermally min. line contact between the rib apices and overwrap enhances this effect. An uppermost circumferential bead on the cup gives a further seal and prevents passage of liquid between the overwrap and sidewall. AS

## 111

### Coffee machine.

Illy, E.

**United States Patent** 4 254 694 (1981) [En]

A coffee machine has a chamber containing a removable pod of ground compressed coffee, and a filter selected from a set. The characteristics of pod and filter are so selected that during each operation of the machine 22-26% of the total aromatic substances present in the coffee in the pod are extracted by hot water flowing through the pod. The quantity of beverage produced during a predetermined operating time and the dilution of extracted aromatic substances will therefore vary in accordance with the selected filter. AS

## 112

### Device for making coffee or the like.

Bruin, J. de; Klomp, J. H. (Netherlands, Koninklijke Fabriek Inventum Fabriek van Instrumenten en Elektrische Apparaten NV)

**United States Patent** 4 256 030 (1981) [En]

Multiple unit device for making coffee or the like is described, which is especially well adapted for use on an aircraft. It comprises: a cradle with a mounted substructure; a holder for receiving a container of coffee, etc., positioned on the substructure; a boiler unit behind the holder; a control unit; and means for perforating the container. AS

## 113

### Decaffeination process.

Strobel, R. G. K.; Eich, R. A. (Procter & Gamble Co.)

**United States Patent** 4 256 774 (1981) [En]

Method is described for decaffeination of coffee beans using a solvent system which comprises benzyl alcohol. AS

## 114

### Process for the decaffeination of coffee.

Zosel, K. (Studiengesellschaft Kohle mbH)

**United States Patent** 4 260 639 (1981) [En]

Process for the decaffeination of coffee is described, which comprises contacting the coffee with moist supercritical CO<sub>2</sub> to remove the caffeine from the coffee and recovering a substantially decaffeinated coffee. Preferred conditions for contact of the moist CO<sub>2</sub> are temp. 40-80°C, pressure 120-180 atm and contact time 5-30 h. AS

## 115

### Organoleptic evaluation of coffee harvested in plastic nets.

Caloni, I. B. de; Hernandez, E. R. de; Gonzalez Roman, M. A.

*Journal of Agriculture of the University of Puerto Rico* 65 (2) 190-191 (1981) [En] [Food Tech. Lab., Univ. of Puerto Rico, Mayagüez Campus, Rio Piedras, Puerto Rico]

Organoleptic evaluations of coffee beans collected with plastics nets at 2, 4, 6, 9 and 10 wk or collected by traditional hand-picking methods in one harvest were carried out. Coffee was prepared from these beans in an Italian percolator using 25 g of roasted, ground coffee beans to 500 ml water. A trained laboratory panel was presented with one pair of samples at each session and preference for aroma and flavour was marked on a 1-6 scale, where 6 = 'like very much', and 1 = 'do not like'. Coffee prepared from hand-picked beans was rated highest (5.0), that from net harvested beans at 2, 4, 6 and 9 wk was acceptable (4.4-4.5), and that from 10 wk was unacceptable (3.8). LH

## 116

### ABC of coffee: coffee terms.

Anon.

*Indian Coffee* 45 (3) 64 (1981) [En]

Definitions of various coffee terms are given. [See FSTA (1981) 13 9H1434 for previous part] CFTRI

## 117

### Electric coffee maker.

Leuschner, U.; Zinsberger, A. (Bosch Siemens Hausgeräte GmbH)

**United States Patent** 4 262 585 (1981) [En]

Electric coffee maker is described in which the water is transported from a fresh-water tank through a cold water line to a water heater, and from there through a hot-water line to a coffee filter. The coffee maker has a time delay valve, which in conjunction with the heater and cold water line holds back or delays the full transport of water from the freshwater tank and permits no flow of water or only a minimal amount of it to be transported for an initial period of time. This permits liquid ducts and receptacles downstream from the water heater to be preheated and thus smaller amounts of really hot coffee can be taken from coffee makers which are designed for larger quantities of coffee. AS

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36. Nisin	<input type="checkbox"/> £9.00	<input type="checkbox"/> £5.00	<input type="checkbox"/> £8.50
37. Cadmium in Foods	<input type="checkbox"/> £9.50	<input type="checkbox"/> £5.50	<input type="checkbox"/> £9.00
38. Coffee	<input type="checkbox"/> £10.00	<input type="checkbox"/> £6.00	<input type="checkbox"/> £10.00
39. Sorbic Acid	<input type="checkbox"/> £10.00	<input type="checkbox"/> £5.50	<input type="checkbox"/> £9.00
40. Arsenic in Foods	<input type="checkbox"/> £9.00	<input type="checkbox"/> £5.50	<input type="checkbox"/> £9.00
41. Ascorbic Acid	<input type="checkbox"/> £9.00	<input type="checkbox"/> £6.00	<input type="checkbox"/> £10.00
42. Thickeners and Gelling Agents	<input type="checkbox"/> £8.50	<input type="checkbox"/> £5.50	<input type="checkbox"/> £9.00
43. Pseudomonadaceae and Food Processing	<input type="checkbox"/> £9.00	<input type="checkbox"/> £5.00	<input type="checkbox"/> £8.50
44. Spores in Food	<input type="checkbox"/> £8.00	<input type="checkbox"/> £6.00	<input type="checkbox"/> £9.50
45. Breadmaking	<input type="checkbox"/> £10.00	<input type="checkbox"/> £5.50	<input type="checkbox"/> £9.00
46. Bread Properties	<input type="checkbox"/> £9.00	<input type="checkbox"/> £5.00	<input type="checkbox"/> £8.50
47. Food Science and Technology Books	<input type="checkbox"/> £15.00	<input type="checkbox"/> £9.50	<input type="checkbox"/> £17.00
48. Nitrates and Nitrates in Meat Products	* <input type="checkbox"/> £10.00	<input type="checkbox"/> £6.00	<input type="checkbox"/> £10.00
49. Eggs and Poultry Meat	<input type="checkbox"/> £15.00	<input type="checkbox"/> £8.50	<input type="checkbox"/> £13.50
50. Mycotoxins in Foods (Excluding Aflatoxins and Microbial Toxins)	* <input type="checkbox"/> £8.00	<input type="checkbox"/> £5.50	<input type="checkbox"/> £9.00
51. Meat Canning	* <input type="checkbox"/> £10.00	<input type="checkbox"/> £5.50	<input type="checkbox"/> £10.00

\* Only available from 1974.

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